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Topliss et al.

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(54) **DIRECT RETINAL PROJECTOR**

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2027/0187; G02B 2027/0178; G06K
9/00604; G06T 19/006

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See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
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OTHER PUBLICATIONS

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(51) **Int. Cl.**

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(57) **ABSTRACT**

A direct retinal projector may include a gaze tracking system that tracks position of a subject's pupil and automatically adjusts projection of a scanned light field so that the light field enters the pupil. A control loop adjusts a scanning mirror to substantially center an IR beam on a position sensing detector (PSD). In so doing, the scanning mirror is correctly positioned so that the scanned light field from the projector enters the subject's pupil. In addition, a direct retinal projector may include an adjustable focusing element that adjusts focus of a combined light beam generated by a projector as the light beam is scanned to an ellipsoid mirror that reflects the light beam to the subject's pupil. The focusing of the scanned beam may be adjusted as the beam is scanned across the azimuth angle of the curved ellipsoid mirror.

(52) **U.S. Cl.**

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(58) **Field of Classification Search**

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20 Claims, 22 Drawing Sheets

Beam at '-20deg' Azimuth

